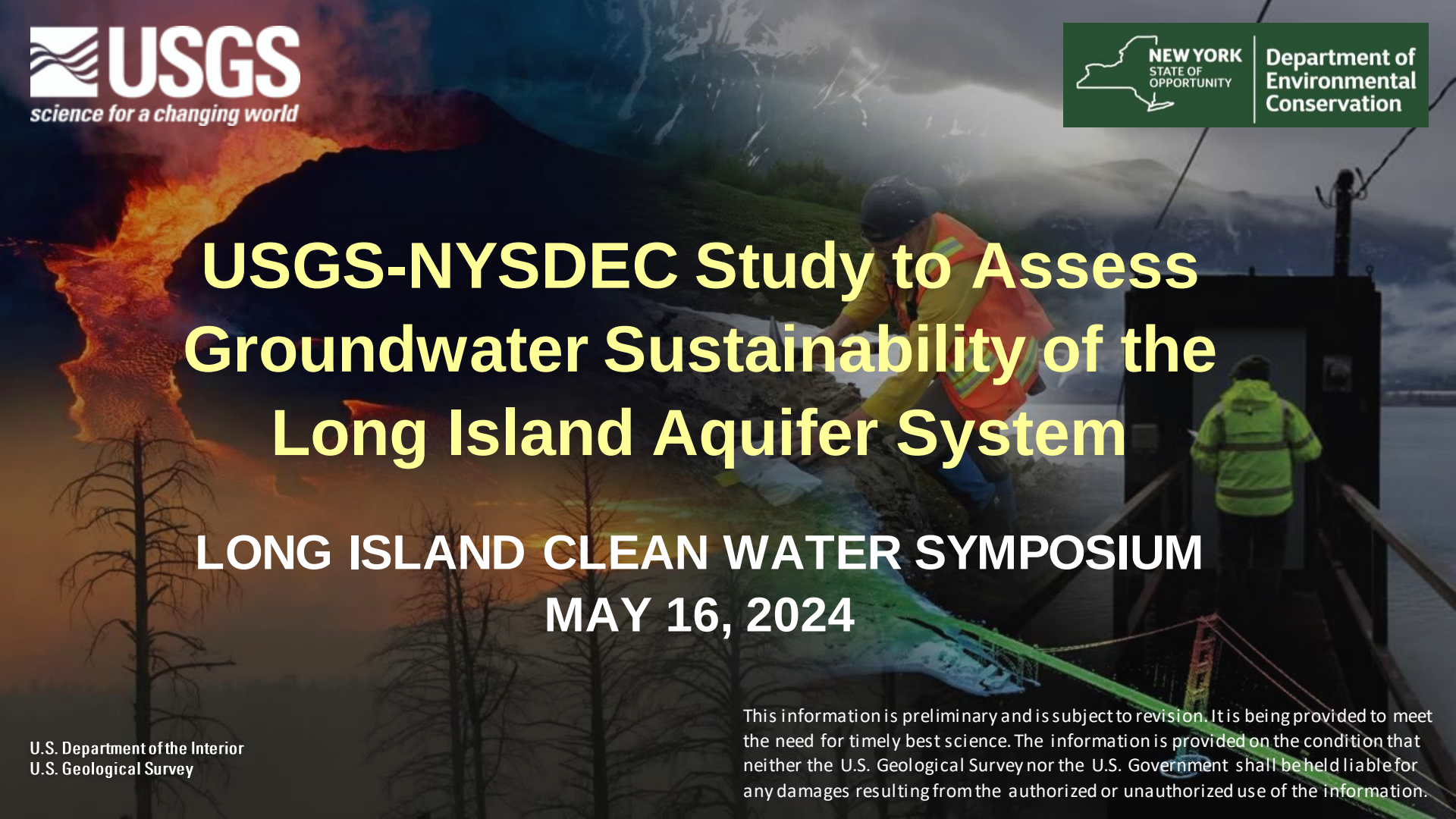


USGS
science for a changing world

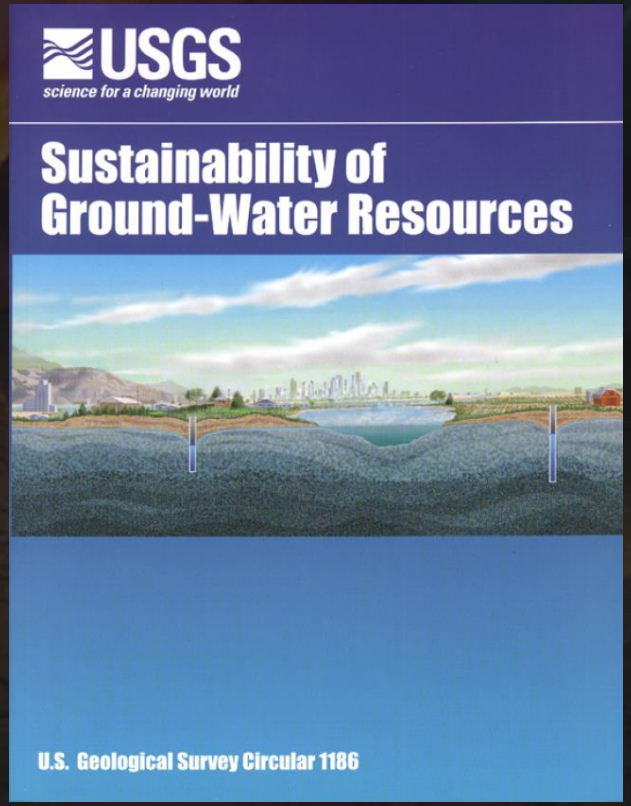
NEW YORK
STATE OF
OPPORTUNITY
Department of
Environmental
Conservation

USGS-NYSDEC Study to Assess Groundwater Sustainability of the Long Island Aquifer System

LONG ISLAND CLEAN WATER SYMPOSIUM
MAY 16, 2024

U.S. Department of the Interior
U.S. Geological Survey

Approach to Assessing Sustainability:



"Because any use of groundwater changes the subsurface and surface environment (that is, the water must come from somewhere), the public should determine the tradeoff between groundwater use and changes to the environment and set a threshold for what level of change becomes undesirable."

USGS

Project Background

In February 2016, New York State announced funding for an Island-wide groundwater sustainability study in response to concerns in Nassau County of potential impacts from emergency, short-term reactivation of shuttered Queens supply wells

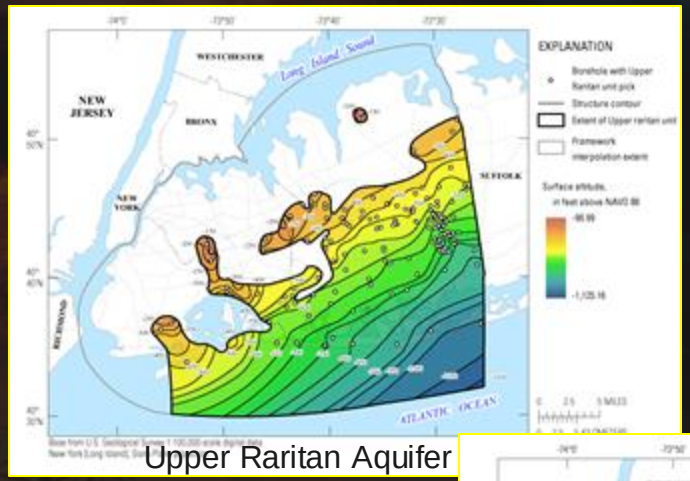
USGS

Project Objectives

- Provide a comprehensive assessment of groundwater sustainability under changing hydrologic stress conditions.
- Revise/improve upon the current understanding of the Long Island hydrogeologic framework.
- Develop a regional characterization of the position and movement of the boundary between fresh and saline groundwater.
- Develop a new regional groundwater-flow model of the Long Island aquifer system.

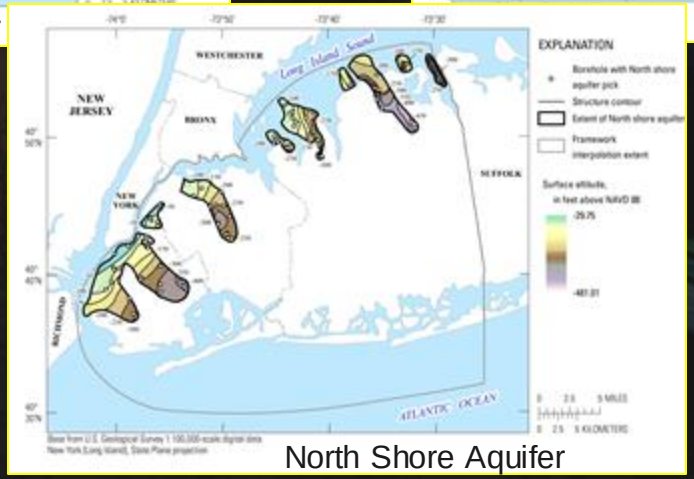
USGS

New Hydrogeologic Units Mapped



Upper Raritan Aquifer

North Shore Confining Unit

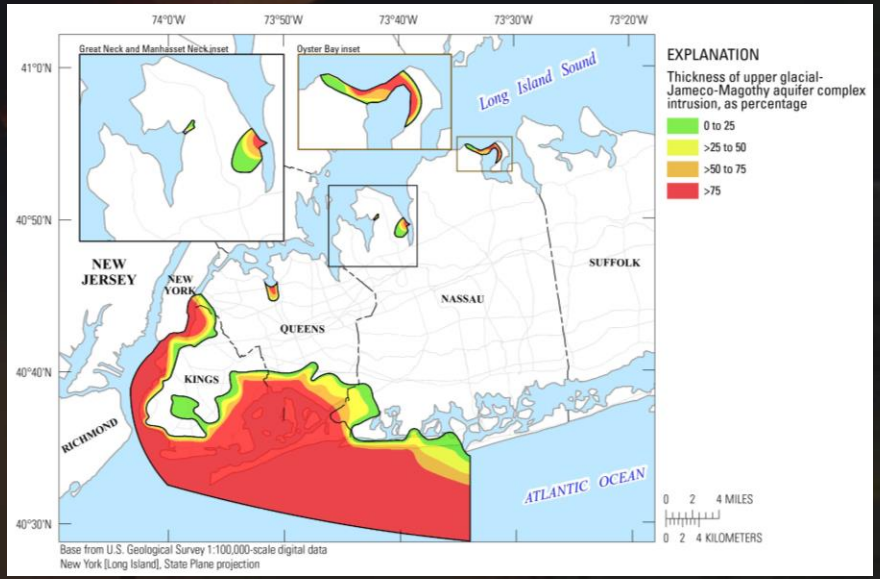


North Shore Aquifer

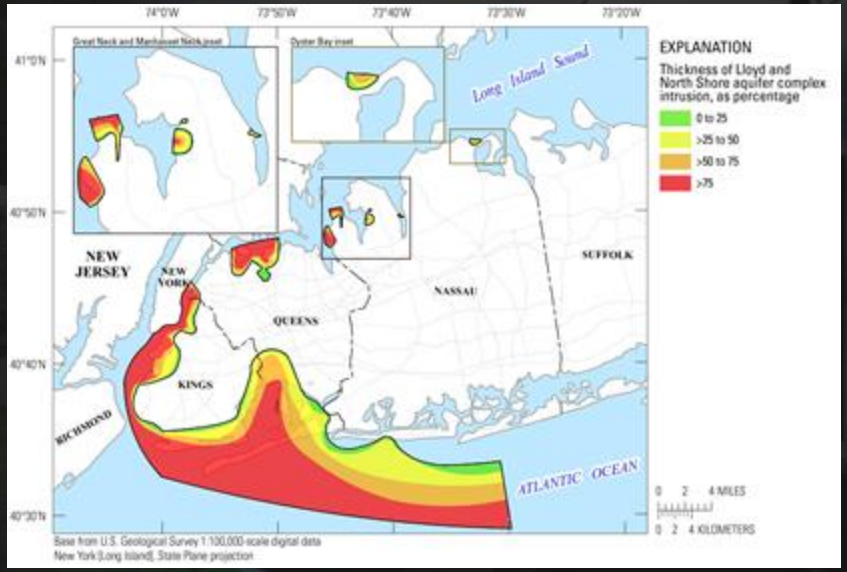
Preliminary Information- Subject to Revision. Not for Citation or Distribution.

USGS

Percent of Aquifer Intruded



UG/Jameco/Magothy Aquifers

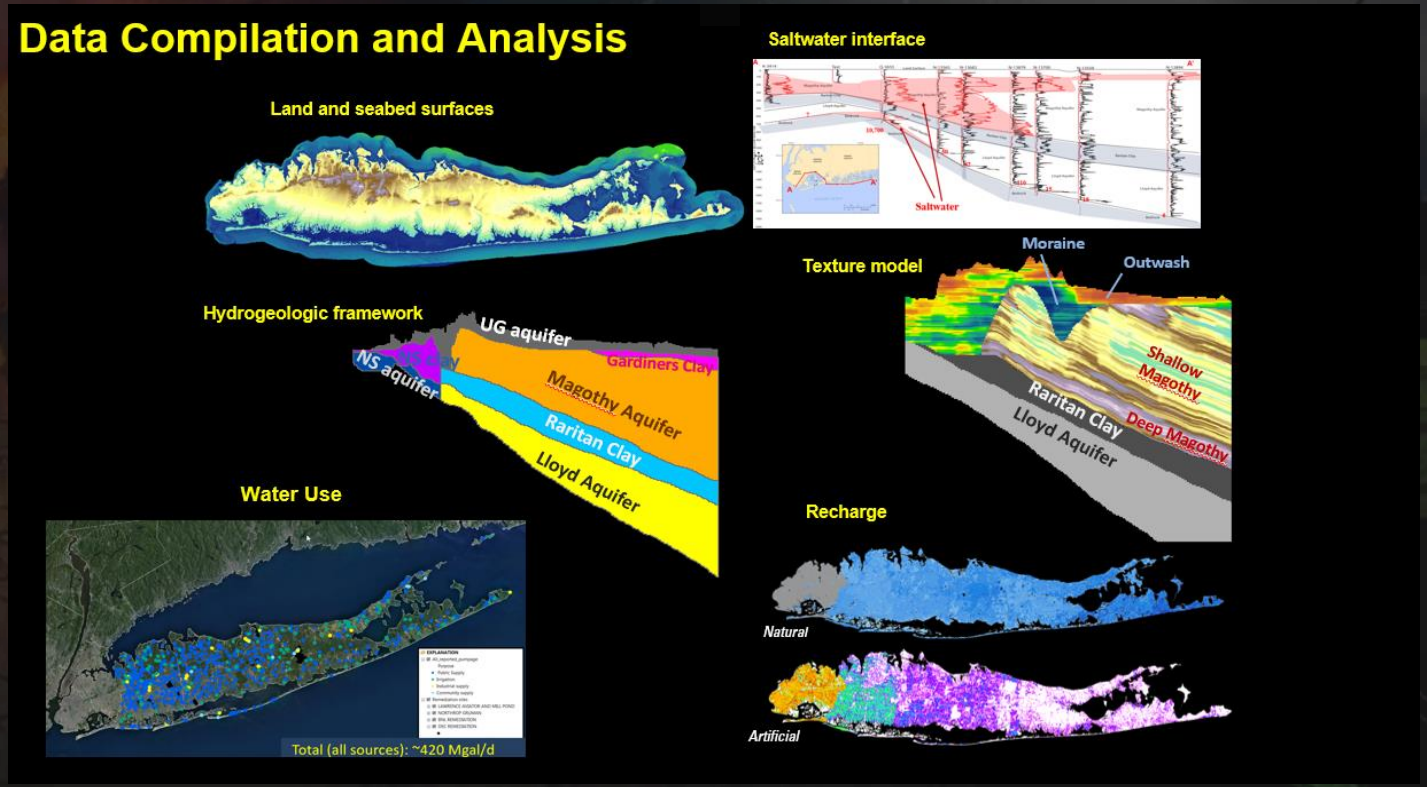


Lloyd North Shore Aquifers

USGS

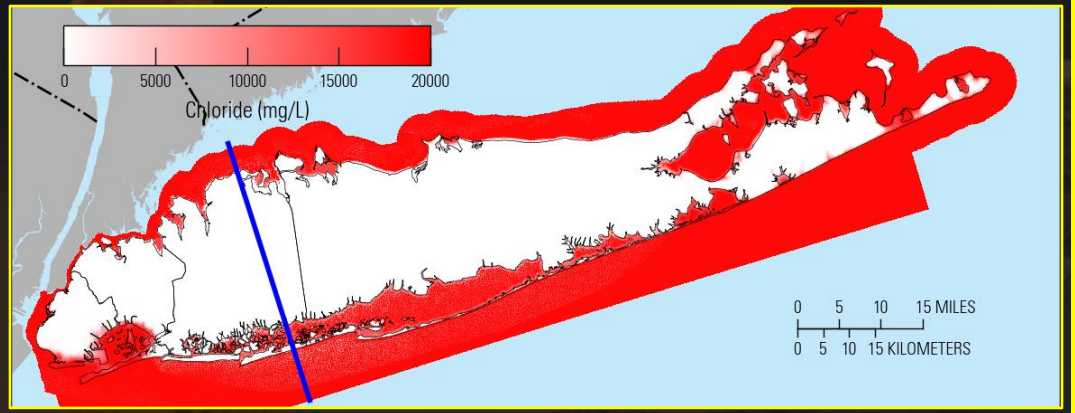
Preliminary Information- Subject to Revision. Not for Citation or Distribution.

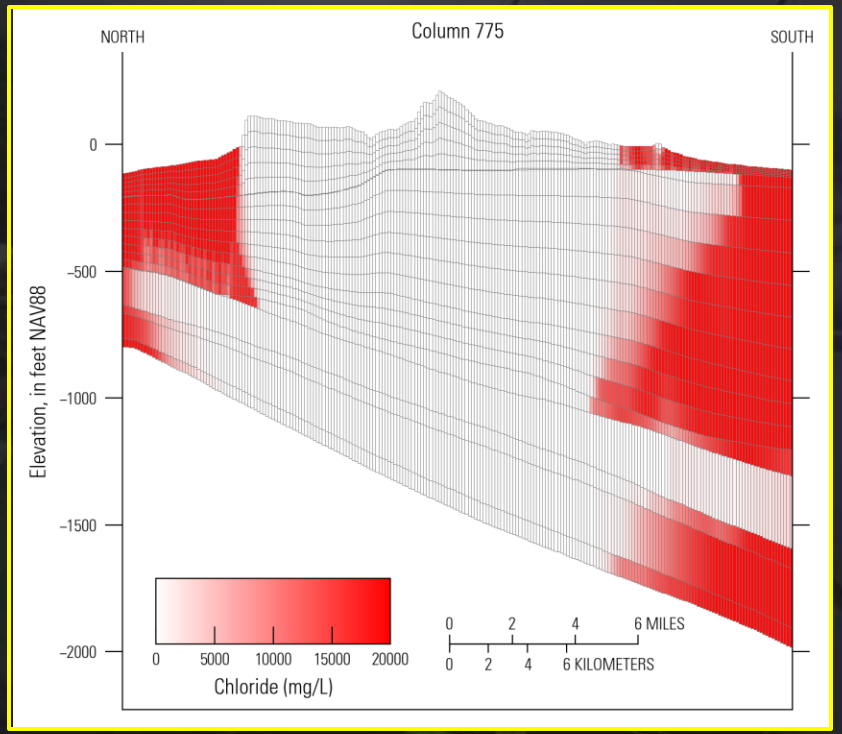
Model Development



Preliminary Information-Subject to Revision. Not for Citation or Distribution.

Model Development





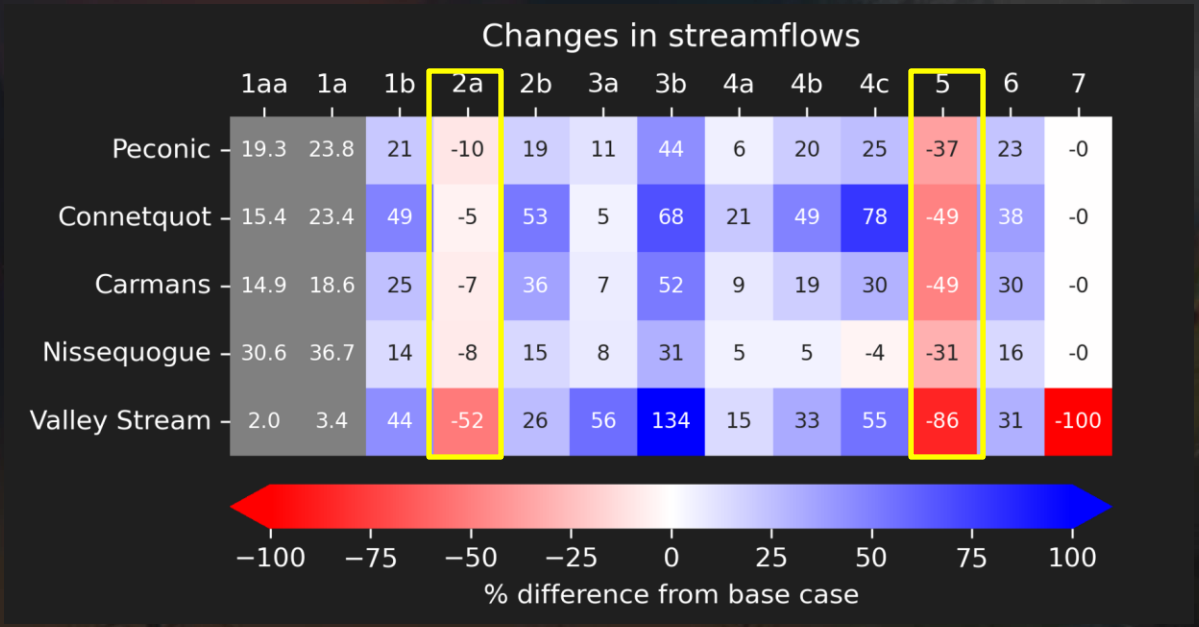
Preliminary Information-
Subject to Revision. Not for
Citation or Distribution.

USGS

Steering Committee Scenarios:

- Sc_1a & 1aa: Average annual & seasonal (2010-2019)
- Sc_2a: peak pumping increased 15%
- Sc_2b: Sc_2a plus natural recharge increased 10%
- Sc_3a: peak pumping decreased 15%
- Sc_4a/b/c sea-level position increased by 3/6/9 feet
- Sc_5: drought (5-yrs): recharge -20%, pumping +20%
- Sc_6: natural recharge increased 10%
- Sc_7: reactivation of JWC wells: 62 Mga/d for 10 years

USGS



Preliminary Information-Subject to Revision. Not for Citation or Distribution.

1b: RCH +10% SLR +3 ft

2a: Peak Pump +15%

2b: 2a + 1b

3a: Peak Pump -15%

3b: 3a + 1b

4a: SLR +3 feet

4b: SLR +6 feet

4c: SLR +9 feet

5: Drought

6: RCH +10%

7: JWC well reactivation

USGS

Major Findings

- Raritan confining unit subdivided into Upper Raritan aquifer and Raritan clay. Raritan clay not as thick and impermeable as originally mapped.

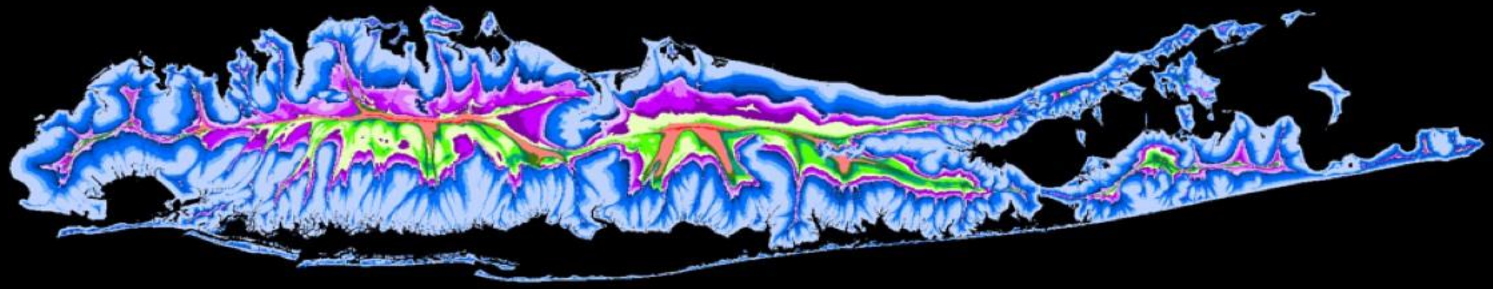
- Inland extent of saltwater intrusion in the Magothy and Lloyd aquifers in Kings and Queens Counties has not receded much despite cessation of major pumping in Jamaica since mid-1980s.

- Previous delineated wedges of saltwater intrusion in the Lloyd and North Shore aquifers in Long Beach, Great Neck, and Manhasset Neck have increased in extent and concentration since the 1980s.

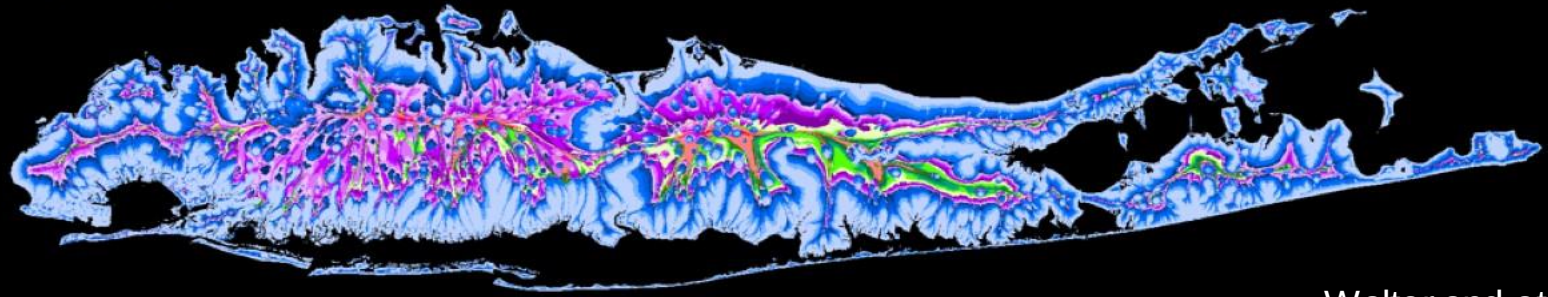
USGS

Groundwater Age Distribution

Predevelopment



2005-15 Stresses

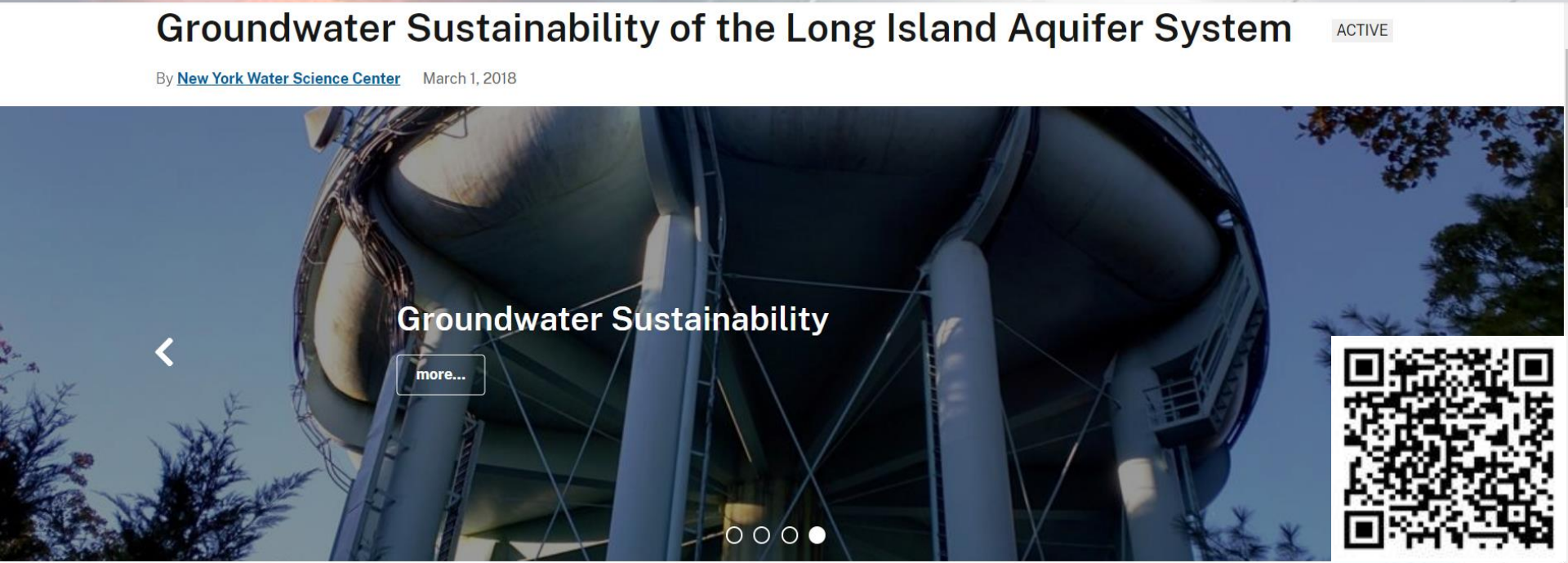


Walter and others, 2020

Travel Times, in years

USGS

GW Sustainability Project Website



https://www.usgs.gov/centers/new-york-water-science-center/science/groundwater-sustainability-long-island-aquifer-system